Aerial Survey Highlights for Colorado 2017

Aerial detection surveys of tree killing or damaging insects and diseases are conducted annually over Colorado's forest lands. This is a cooperative effort between the US Forest Service and the Colorado State Forest Service. In 2017, 27 million acres were surveyed by 6 federal and state surveyors. Highlights of the survey are reported below. All reported agents are insects that kill and/or defoliate trees. This report includes only forest damage that is visible from the air.

Spruce Beetle

- Since 1996, spruce beetle has affected approximately 1,782,000 acres to varying degrees in Colorado.

- Spruce beetle activity was detected on 206,000 acres in Colorado in 2017. Of these, 67,000 acres are in areas not previously mapped as having spruce beetle activity (new acres*). This epidemic continues to expand (Figures 1 and 2). A heavily impacted stand with current beetle activity is shown in Figure 3.

- The spruce beetle epidemic is expanding most rapidly in southern Colorado's forests and impacts many thousands of acres. Areas affected are found from the New Mexico border to north of Cottonwood Pass. Aerial survey in south central Colorado showed spruce beetle epidemics expanded on the San Juan (9,000 new acres on 25,000 active acres**), Rio Grande (7,000 new acres on 47,000 active acres), Gunnison (10,000 new acres on 39,000 active acres), and San Isabel (9,000 new acres on 29,000 active acres) National Forests. Infestations on the San Isabel National Forest continued expanding north onto 3,800 new acres in Park County.

- In northern Colorado, spruce beetle caused new notable tree mortality in and adjacent to Rocky Mountain National Park. Spruce beetle is found on 6,000 new acres and is active on 18,000 acres in Grand and Larimer Counties.

- Although actively infested acres are lower than 2016 (Figure 1), there is potential to affect contiguous spruce forests between expanding outbreaks in northern and central Colorado (Figure 2 and 4).

  * New acres are those of insect or disease activity not previously mapped during aerial detection survey.

  ** Active acres indicate the entirety of an area of insect or disease activity including areas that may have been impacted in previous years.

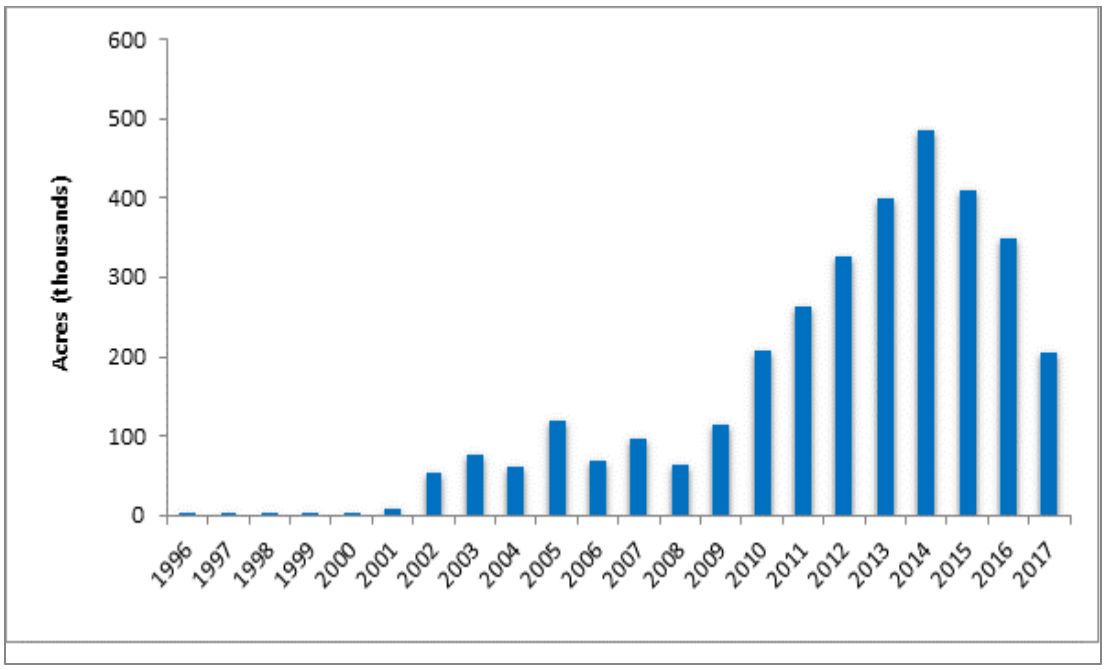

Figure 1. Annual acres affected by spruce beetle in Colorado 1996 - 2017.

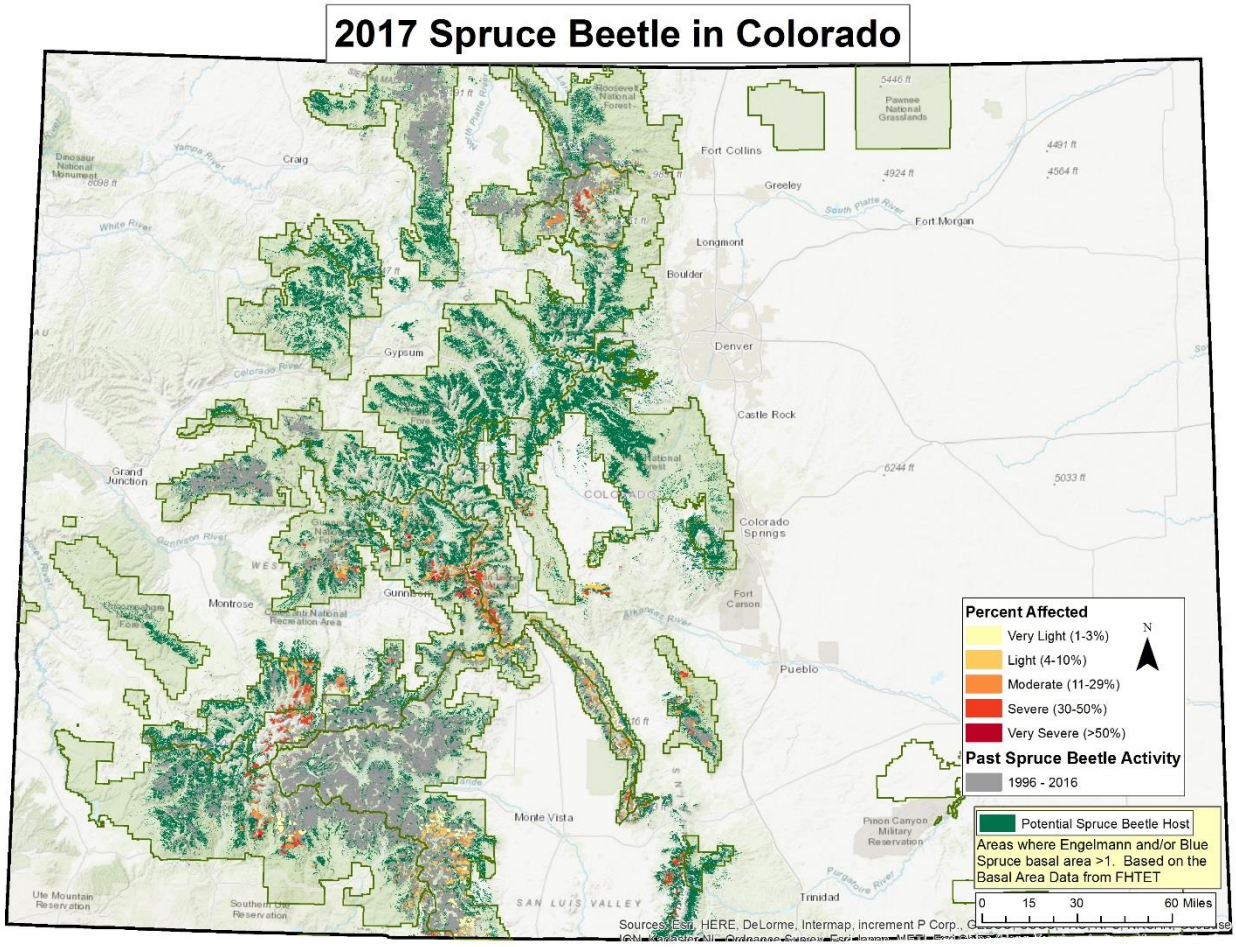

Figure 2. Spruce Beetle activity in Colorado 1996-2017.

Figure 3. A mix of recent and older mortality caused by spruce beetle on the Rio Grande National Forest. Photo: Justin Backsen.

Figure 4. New spruce mortality in the Collegiate Peaks of the Sawatch Range. Photo: Justin Backsen

Mountain Pine Beetle

- The epidemic has ended in Colorado (Figure 5). Larger lodgepole pine trees have been depleted in the core outbreak areas, but smaller trees and new regeneration remain. Mountain pine beetle affected about 3.4 million acres in Colorado since 1996.

- The mountain pine beetle-affected area in Colorado did not expand in 2017. Less than 900 acres of mountain pine beetle activity was observed statewide.

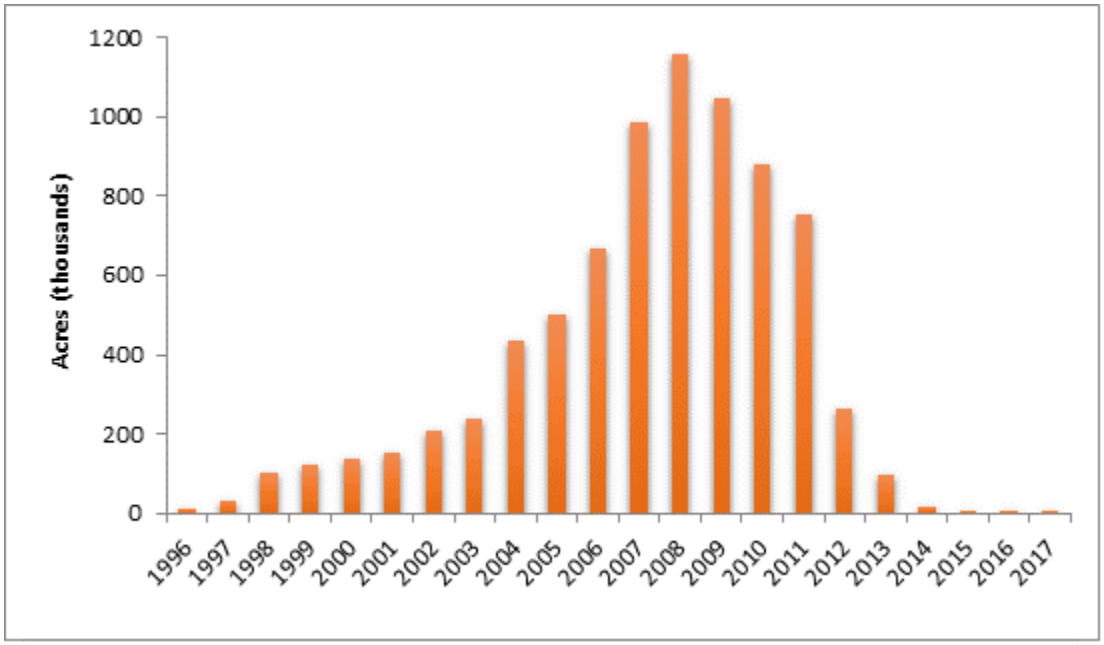

Figure 5. Annual acres affected by mountain pine beetle in Colorado 1996-2017.

Roundheaded Pine Beetle

- Roundheaded pine beetles and associated bark beetles have killed ponderosa pines in Dolores County for several years and affected nearly 11,000 acres in 2017 (Figure 6 and 7). In the state, this insect has only been reported from southwestern Colorado and epidemics tend to grow more slowly and are more localized than spruce beetle or mountain pine beetle. The persistence and expansion of this particular epidemic are notable.

- Roundheaded pine beetle may be part of a bark beetle complex that includes western pine beetles, pine engraver beetles or mountain pine beetles also attacking the same trees.

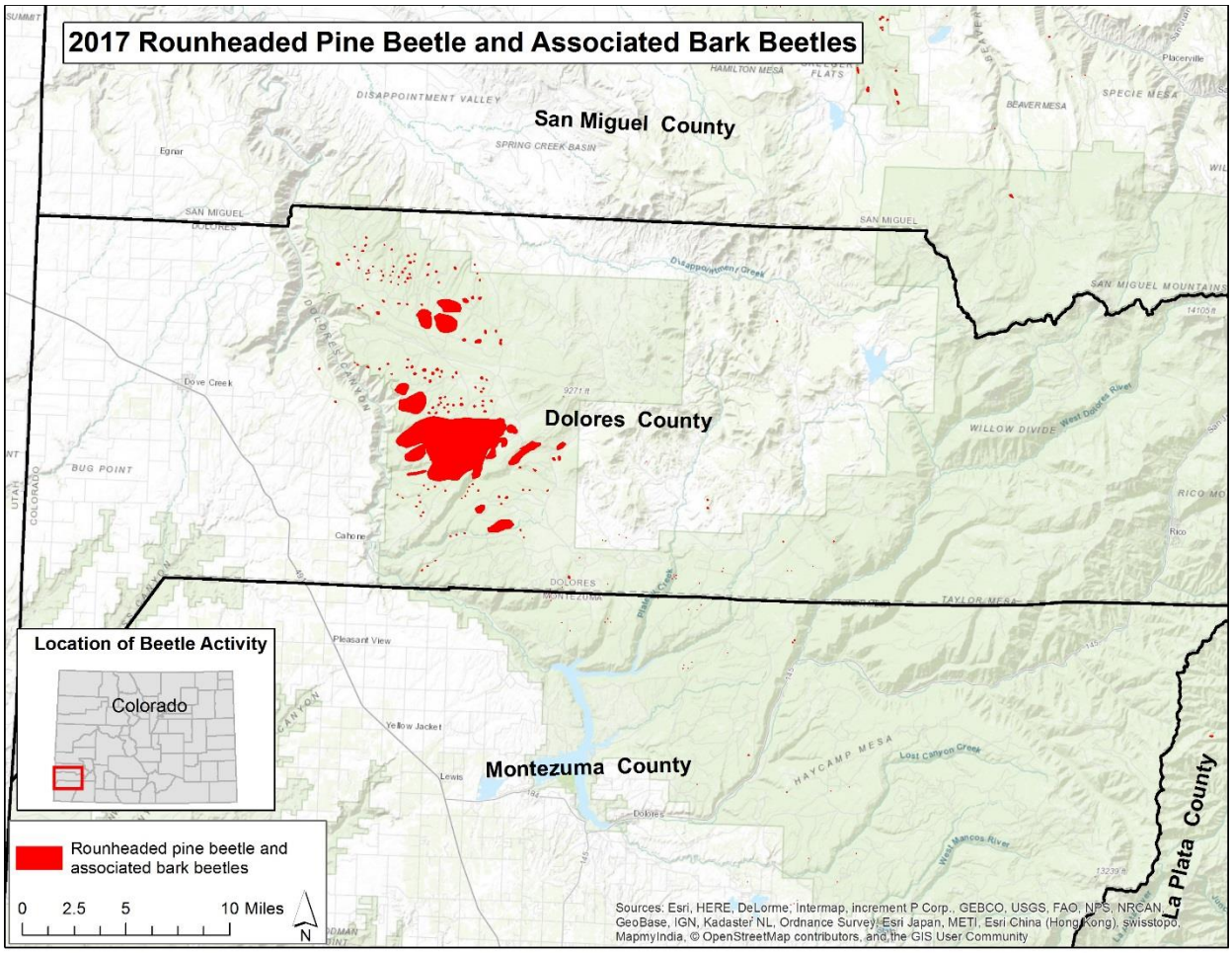

Figure 6. Roundheaded pine beetle activity in ponderosa pine forests in southwestern Colorado.

Figure 7. Ponderosa pines killed by roundheaded pine beetle in Dolores County. Photo: Dan West

Douglas-fir Beetle

- Douglas-fir beetle activity was detected on 14,000 acres and expanded onto 11,000 new acres in CO. In recent years, levels of Douglas-fir tree mortality have varied widely from scattered mortality in some stands to almost total loss of mature Douglas-fir in others. The mortality is geographically widespread and affects Douglas-fir in almost all locales throughout the state (Figure 8). Notable areas affected include portions of the Flat Tops Wilderness, Rampart Range and Sangre De Cristo Mountains, and forests surrounding the communities of Gunnison, Salida, Aspen, Ouray, Telluride, and Eagle.

Figure 8. Douglas-fir beetle caused tree mortality in an area surrounded by older spruce beetle killed trees.

Western Balsam Bark Beetle

- Western balsam bark beetle activity was detected on 50,000 acres in subalpine fir across Colorado. These infestations are generally widespread but kill fewer trees per acre than other bark beetles currently active in the state (Figure 9). This tree mortality is often associated with root disease in high elevation forests.

- Where western balsam bark beetle occurs in spruce beetle affected stands overall stand mortality is increased.

Figure 9. Western balsam bark beetle caused mortality in subalpine fir typically occurs at low intensity in a given year but overtime can remove many of the older trees in a stand. Photo: Justin Backsen

Fir Engraver:

- Acres affected by fir engraver on white fir continue to decrease in southern Colorado from approximately 19,000 acres in 2015, 6,300 in 2016, to 2,500 in 2017. Outbreaks of fir engraver beetle are often associated with localized drought conditions and may occur in areas where white fir has matured on sites more favorable to ponderosa pine.

Western Spruce Budworm

- Western spruce budworm activity decreased in Colorado in 2017, but was locally abundant across the state. Aerial surveys detected 252,000 defoliated acres in the state in 2017.

- This insect feeds on the new needles of white fir, Douglas-fir and less notably on spruce and subalpine fir. Drying needles webbed to twigs impart a brown cast to infested trees (Figure 10)

- Activity was most notable on the White River, Pike-San Isabel, Gunnison, San Juan, and Rio Grande National Forests and adjoining lands.

Figure 10**.** Western spruce budworm defoliated trees near Marshall Pass on the San Isabel National Forest. Photo: Dan West

Western Tent Caterpillar and Large Aspen Tortrix

- Defoliation of aspen in 2017 was detected on 38,000 acres, caused by western tent caterpillar, with lesser amounts caused by large aspen tortrix (Figure 11). Defoliation can lead to tree mortality if it occurs repeatedly over several years, especially during droughts. 2017 defoliation was higher than reported in 2016.

- Defoliated aspen typically grow new leaves in mid-late summer.

Figure 11. 2016 Aspen defoliation caused by large aspen tortrix or western tent caterpillar on the Rio Grande National Forest. Photo: Brian Howell.

Aspen Discoloration

- Discolored aspen foliage was detected on only 40,000 acres in 2017 throughout aspen stands in Colorado. Discolored aspen foliage is typically caused by foliar diseases which are often associated with wetter than average spring and early summer weather. Marssonina leaf blight, is the most common leaf disease of aspen in our area. Although this disease causes defoliation, it is weather dependent and may be common one year and difficult to detect the next. Tree mortality associated with this disease is rare.